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Plastic Pipe for Farm Water Distribution

The most common and generally suitable type of plastic pipe used for farm water distribution systems is flexible polyethylene (PE). PE pipe is lightweight, easy to install and relatively inexpensive. It is resistant to most chemicals at normal temperatures. Ensure the PE pipe you choose is suitable for water distribution. Water distribution pipe must be C.S.A. certified and stamped "for potable water use".

Rigid and semi-rigid plastic pipe, such as polyvinyl chloride (PVC), acrylonitrile-butadiene-styrene (ABS) and chlorinated polyvinyl chloride (CPVC) are most commonly used for household plumbing. PVC or ABS are usually installed in drain, waste and vent systems. Polybutylene pipe is also available. It is a thermoplastic pipe which is normally used to carry hot water for underfloor heating. CPVC is occasionally used for household water lines. Rigid PVC pipe is very cost competitive with PE pipe. This is particularly true for longer and higher pressure waterlines.

Pressure ratings

Most farm water distribution systems have an operating pressure of 20 to 40 psi. However, pressures may reach as high as 80 psi when pumping over long distances or uphill. Consequently, a variety of pressure rated pipe is available.

Low, medium and high density PE pipe is available. Low density is recommended because it is more resistant to damage, more flexible and easier to join. The plastic pipe you purchase should be C.S.A. approved. This will ensure that the pipe will readily withstand its rated pressure and be of consistent quality.

- 50 psi pressure rated pipe is used primarily for overground transmission of water and is not recommended for permanent installation or burial.
- 75 to 100 psi pressure rated pipe is suitable for underground burial and general use in the water distribution system.
- 100 to 165 psi pressure rated pipe is suitable for use as drop-pipe for submersible pumps. The rating of the pipe will depend upon length of drop pipe and weight of pump. Galvanized pipe may be required at depths over 250 feet.

Gasket type connections are also used for PVC pipe. These connections also require careful installation but are usually taken into consideration. Proper fit, clean gasket recesses and gaskets, and careful insertion are very important.

Thrust blocking at elbows and fittings is also necessary in many situations. Thrust at a 90 degree elbow, on two-inch pipe, can be as high as 630 pounds with 100 psi internal pressure.

Pipe connections

Nylon, plastic, galvanized or brass fittings can be used with PE pipe. In water that contains excessive alkalinity or hardness, nylon fittings are recommended. In installations where pressures are greater than 75 psi, metal fittings are recommended. Use 100 per cent stainless steel clamps for all connections and double clamp buried connections.

When making connections with PE pipe in cool weather, the pipe ends should be softened with hot water. **Do not soften PE pipe with a torch or open flame,** the flame can do permanent damage to the chemical make-up of the pipes, which may result in weakened or leaky pipes.

When installing PE pipe in the trench, the pipe should be "snaked" along the trench bottom to allow for expansion and contraction. The pipe should be checked for leaks before backfilling. Backfill the trench carefully, ensuring that no rocks or frozen clumps of soil can damage the pipe. **Open trenches and excavations are extremely dangerous!**

Rigid plastic pipes (PVC, ABS, CPVC) use solvent welded joints. Each specific type of pipe uses its own specific type of solvent and great care should be taken to use the correct solvent. Therefore, PVC, ABS and CPVC must not be mixed. PVC pipe used for farm water lines (less than three inch I.D.) will typically have pressure ratings of 160, 200 or 250 psi.

Pipe sizing

The selection of the correct diameter or pipe depends upon vertical lift maximum flow rate and the length of the system. As the flow rate and length increase, pipe diameter must be increased to keep

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friction loss to a minimum. (Friction loss is the resistance flow).

Table 1 can be used to select the correct pipe diameter. If you are planning an installation, technical assistance can be obtained from an agricultural engineering technologist who can be contacted through your local district agriculturist or your district home economist.

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Table 1. Recommended Pipe Sizes
(Nominal Size in Inches)

FLOW RATE (GPM)	LENGTH OF PIPE 200 ft	400 ft	600 ft	800 ft	1000 ft
2	1	1	1	1	1
4	1	1	1	1¼	1¼
6	1	1¼	1¼	1¼	1¼
8	1¼	1¼	1¼	1½	1½
10	1¼	1¼	1½	1½	1½
12	1¼	1½	1½	1½	1½
14	1¼	1½	1½	2	2
16	1½	1½	2	2	2
18	1½	2	2	2	2
20	2	2	2	2	2

NOTE: In sizing the above lines, no allowance has been made for elevation differences. For more specific information contact the engineering technologist in your area.

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